

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

| September, 1896. | Pressure at sea level. | | | Temperature. | | | | | Humidity. | | | Wind. | | Cloudiness. | Rain measured at 6 a. m. |
|------------------|------------------------|---------|---------|--------------|---------|---------|----------|----------|-----------|---------|-----------|------------|--------|-------------|--------------------------|
| | 9 a. m. | 3 p. m. | 9 p. m. | 6 a. m. | 2 p. m. | 9 p. m. | Maximum. | Minimum. | Relative. | | Absolute. | Direction. | Force. | | |
| | | | | | | | | | 9 a. m. | 9 p. m. | | | | | |
| 1 | Ins. | Ins. | Ins. | 76 | 82 | 76 | 84 | 73 | 61 | 74 | 6.7 | ne. | 3 | 3-6 | Ins. |
| 2 | 30.06 | 30.00 | 30.04 | 76 | 81 | 77 | 84 | 74 | 61 | 70 | 7.0 | e-ne. | 4 | 4 | 0.04 |
| 3 | 30.06 | 29.98 | 30.04 | 76 | 81 | 77 | 84 | 74 | 61 | 70 | 7.0 | e-ne. | 4 | 4 | 0.06 |
| 4 | 30.02 | 29.95 | 29.98 | 74 | 81 | 76 | 82 | 73 | 72 | 74 | 7.8 | ne. | 3 | 7 | 0.13 |
| 5 | 29.99 | 29.92 | 29.98 | 74 | 81 | 76 | 82 | 73 | 75 | 82 | 8.6 | e-ne. | 4 | 5-10 | 0.06 |
| 6 | 30.04 | 29.96 | 30.05 | 76 | 81 | 73 | 85 | 75 | 82 | 91 | 8.7 | s-n. | 1-4 | 10 | 0.81 |
| 7 | 30.01 | 29.95 | 30.01 | 75 | 81 | 77 | 83 | 75 | 67 | 70 | 7.1 | ne. | 4 | 3-6 | 1.03 |
| 8 | 30.00 | 29.95 | 29.98 | 73 | 76 | 77 | 79 | 72 | 77 | 70 | 7.4 | ne. | 3 | 6 | 0.33 |
| 9 | 29.98 | 29.92 | 29.98 | 76 | 80 | 77 | 81 | 71 | 68 | 74 | 7.4 | ne. | 6 | 4 | 0.41 |
| 10 | 30.06 | 30.00 | 30.07 | 76 | 82 | 77 | 82 | 75 | 69 | 75 | 7.4 | ne. | 5 | 6 | 0.06 |
| 11 | 30.07 | 30.00 | 30.06 | 74 | 81 | 77 | 82 | 73 | 68 | 72 | 7.4 | ne. | 4 | 5 | 0.06 |
| 12 | 30.01 | 29.94 | 30.02 | 76 | 82 | 76 | 85 | 75 | 60 | 76 | 7.1 | ne. | 4 | 4 | 0.02 |
| 13 | 29.99 | 29.94 | 30.00 | 76 | 81 | 77 | 81 | 73 | 76 | 74 | 7.5 | e-ne. | 4 | 5 | 0.02 |
| 14 | 30.01 | 29.96 | 30.04 | 75 | 81 | 75 | 82 | 72 | 72 | 68 | 7.3 | e-ne. | 5 | 5 | 0.08 |
| 15 | 30.06 | 29.98 | 30.03 | 74 | 81 | 78 | 83 | 73 | 71 | 69 | 7.2 | ne. | 3 | 3 | 0.13 |
| 16 | 30.06 | 29.97 | 30.05 | 76 | 81 | 78 | 83 | 74 | 68 | 71 | 7.2 | ne. | 2-5 | 3 | 0.09 |
| 17 | 30.06 | 29.98 | 30.07 | 75 | 83 | 79 | 84 | 73 | 71 | 71 | 7.5 | ne. | 3 | 2 | 0.07 |
| 18 | 30.11 | 30.02 | 30.08 | 77 | 82 | 78 | 83 | 74 | 68 | 70 | 7.4 | n-ne. | 3 | 3 | 0.05 |
| 19 | 30.09 | 30.03 | 30.08 | 77 | 81 | 78 | 83 | 75 | 70 | 68 | 7.1 | ne. | 3 | 8 | 0.00 |
| 20 | 30.08 | 29.99 | 30.07 | 76 | 82 | 77 | 83 | 74 | 64 | 68 | 6.9 | ne. | 4 | 3 | 0.11 |
| 21 | 30.06 | 30.00 | 30.07 | 74 | 80 | 77 | 82 | 71 | 66 | 68 | 7.0 | ne. | 5 | 5 | 0.30 |
| 22 | 30.10 | 30.01 | 30.09 | 75 | 80 | 78 | 82 | 75 | 64 | 68 | 7.0 | ne. | 4 | 3 | 0.07 |
| 23 | 30.08 | 30.02 | 30.10 | 74 | 80 | 77 | 81 | 72 | 68 | 71 | 7.1 | ne. | 5 | 4 | 0.32 |
| 24 | 30.06 | 29.99 | 30.07 | 74 | 80 | 75 | 81 | 72 | 68 | 77 | 7.1 | ne. | 4 | 4 | 0.06 |
| 25 | 30.08 | 29.97 | 30.04 | 74 | 79 | 76 | 81 | 72 | 71 | 74 | 7.1 | ne. | 4 | 4 | 0.23 |
| 26 | 30.08 | 29.96 | 30.03 | 74 | 81 | 77 | 83 | 72 | 68 | 71 | 7.3 | ne. | 3 | 5 | 0.07 |
| 27 | 30.08 | 29.96 | 30.06 | 73 | 79 | 74 | 81 | 70 | 77 | 77 | 7.4 | ne. | 2 | 10 | 0.01 |
| 28 | 30.05 | 29.98 | 30.06 | 69 | 81 | 76 | 82 | 67 | 79 | 74 | 7.4 | ne. | 1-3 | 10-2 | 0.01 |
| 29 | 30.08 | 29.98 | 30.06 | 71 | 80 | 73 | 81 | 67 | 73 | 77 | 7.2 | n-ne. | 2-0 | 8-2 | 0.03 |
| 30 | 30.09 | 29.99 | 30.07 | 73 | 80 | 76 | 83 | 70 | 68 | 64 | 6.6 | n-ne. | 2 | 1 | 0.16 |
| 30 | 30.06 | 29.95 | 29.99 | 72 | 79 | 76 | 81 | 72 | 68 | 70 | 6.9 | n-ne. | 3 | 4 | 0.00 |
| | 30.05 | 29.98 | 30.04 | 74.5 | 80.6 | 76.6 | 82.3 | 72.4 | 69.7 | 72.6 | 7.3 | ne. | 3.5 | 4.7 | 4.34 |

Mean temperature: 6+2+9+3 is 77.2; the normal is 77.4; extreme temperatures, 85° and 67°. Two directions of wind, connected by a dash, indicate change from one to the other; also same for force.

LIGHTNING FLASHES BY PAIRS.

In regard to the electric storm of September 17 at Montpelier, Ohio, the observer, Mr. Waterston, states that—

One of the strange features of the lightning was that many of the bolts appeared to descend in pairs, about 10 feet apart. * * * I examined a tree that was struck by lightning, and it looked as though three bolts had come down it. * * * Parties living near by say that one of those double bolts was plainly seen coming down in the direction where the tree stood. Other persons report that where bolts came down and struck the ground several good-sized holes were made.

[NOTE.—It is not uncommon for a lightning flash to divide into several parts as it nears the ground, but these will hardly be called double or triple bolts. It is, however, rare to find the exact spot where a bolt has struck the ground, and if a hole is identified as certainly caused by the lightning, then it will always be interesting to dig down and recover, at least, a fragment of the long fulgurite, or tube, that is apt to be formed by the melting together of the grains of soil by the lightning as it passes downward.]

THE NOR'WESTERS OF CANTERBURY.

In the New Zealand Alpine Journal, Vol. II., No. 8, the editor, Mr. J. T. Meeson, has a paper on the hot, dry winds that blow from the northwest across the mountains and over the eastern plains of both islands, and are felt in their greatest intensity in the Province of Canterbury, in the South Island. The following abstract is from the Bulletin of the American Geographical Society, Vol. XXVII, p. 409:

These winds are most frequent in the late spring and summer, from October to March, with their greatest strength perhaps in February at the time of the wheat harvest. The "nor'wester" comes on as follows: The wind blows for two or three days from the northeast and then dies away, or veers to the north; light, cirrus clouds drift in the upper sky from the northwest; the barometer falls, sometimes very fast, and the thermometer rises. A few hours of delicious weather succeed, and then, within twenty-four hours or less, comes the northwest wind, gentle at first, and even cool, with an occasional warm puff. A beauti-

ful arch of cumulus clouds stretches across the heavens from the north to the west or southwest, and below it the sky is of a peculiar, soft blue. The arch sometimes remains through the storm, sometimes it is dissipated in a few hours. The force of wind increases to a gale, with clouds of dust and a stifling heat. Vegetation droops and withers, and human beings suffer with lassitude, headache, and neuralgia. The mountains to the west are covered with black clouds—the true *föhn* wall—and heavy rain falls there.

This state of things lasts sometimes for days, sometimes for a few hours, when the wind veers to the west, the barometer rises, the thermometer falls, and a cold southwest wind sets in for a time, and often the process begins again. Mr. Meeson regards this hot wind as a true *föhn*, and he accounts for it in this way: The northwest wind, charged with moisture, strikes the west coast at a temperature of 60° F. By the time it reaches the tops of the mountains, at 9,000 feet, it loses 30° of heat, while in descending the eastern side of the mountains it gains 50°, and reaches the Canterbury plains as a dry wind, with a temperature of 80° F. To this temperature is added the heat always developed in front of a cyclone.

The "nor'wester" is, on the whole, a beneficial agent. Some persons hold that it is essential to the maturity of the wheat crop; it kills or blows away the germs of disease, purifies the atmosphere, melts the snows, and plays a great part in the development of animal and vegetable life.

THE MOVEMENT OF THUNDERSTORMS AGAINST THE WIND.

The following contribution to this subject is sent by Mr. Fred. W. Rausch, now living at Topeka, Kans., in a letter dated January 20, 1896:

In regard to the phenomenon reported by Mr. E. D. Hicks in the April Review, page 131, I would say that I have often observed the same in western Missouri, eastern and south central Kansas, but more so during my eight years' residence in eastern Colorado. In Colorado thunderclouds would almost always move in a southeast direction [i. e., from northwest to southeast.—C. A.]. As nearly all our rain during summer in southeast Colorado fell from thunderclouds, I gave the same particular attention. The clouds would form apparently above the mountains during the day, and in the evening break away to the southeast. If the wind was strong from the east or southeast the same would form in a solid black bank; otherwise, float off apart; in either case with more or less rain. The longer the wind would hold out against the cloud the heavier the rain. If the wind changed in the northwest in advance of the cloud, we received mostly wind. When the clouds came from the southwest against the wind, we seldom received rain in paying quantities; the same would appear to roll over one another, and where accompanied by a gale of wind the rain would do more harm than good, causing the dust to settle on the side exposed to the rain and to form a coat of mud. We called these dry rains. Side views of the falling rains traveling against the wind would show a front like this, and sometimes [The sketches are omitted; they simply show the curved streaks of falling rain stretching from the rain cloud to the ground, the convex side of the streak being on the side toward which the wind is blowing and the cloud moving. Sometimes such streaks have a double curvature, indicating two or more layers of wind from different directions.—C. A.], the wind seeming to be the strongest at the curve of the rain streak. Such rains would never last long, but were quite heavy. After the clouds were over [passed overhead] the wind would for a time return to the southeast and often blow the rain back when it was clear overhead; in fact, the wind would spread from the cloud in all directions, but always traveling with the cloud as the same passed over.

On the same subject Mr. W. D. Bruner, Weather Bureau Observer at Mobile, Ala., under date of January 21, 1896, writes:

In reference to the interesting "Notes by the Editor" in the April and August (1895) numbers of the MONTHLY WEATHER REVIEW, under the heading "Do thunderstorms advance against the wind?" I wish to offer the following remarks, which will, perhaps, serve as an explanation. Having led a pastoral life on the western plains I have frequently remarked the phenomena mentioned.

The thunderstorms of the western plains are, perhaps, not unlike those of any other part of the country, but the topography of the country, absence of trees, etc., facilitate the wide range of observation. These storms usually move from a westerly direction, dissipating in their easterly movement, and for short periods are noted for violence and energy. They have a limited rainfall area which is confined to the path of the storm. The storms are generally preceded by a stratum of high cirrus clouds, followed by dark stratus and nimbus clouds, boiling and seething with the conflicting air currents, often presenting a picture of grandeur seldom equaled. As the storm nears the point of observation the wind freshens toward the storm, but a calm prevails for a short period as the nimbus cloud approaches.